

U.S. National Phase Entry of
International Application No. PCT/GB97/01667
Filed: 2 December 1998
PRELIMINARY AMENDMENT

Please add the following new claims.

--8. A method of increasing the refractoriness of inorganic fibers having a composition containing SiO₂ and CaO, or SiO₂, CaO, and MgO, comprising:

- (1) including in the fiber composition a P₂O₅ former in an amount such that:
- (a) $\{\text{SiO}_2\} + (\{\text{P}_2\text{O}_5\} - (58 + 0.5(\{\text{MgO}\} - 10))) > -2.4 \text{ wt\%}$ if $\{\text{MgO}\} > 10 \text{ wt\%}$;
and
- (b) $\{\text{SiO}_2\} + (\{\text{P}_2\text{O}_5\} - 58) > -2.4 \text{ wt\%}$ if $\{\text{MgO}\} \leq 10$; and optionally
- (2) including in the fiber composition a B₂O₃ former such that {B₂O₃} is in the range from 0 to 4 wt%;
- wherein {SiO₂}, {P₂O₅}, {MgO}, and {B₂O₃} are the concentrations of SiO₂, P₂O₅, MgO, and B₂O₃, respectively, in the fiber in wt%;
thereby producing inorganic fibers having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours.--

--9. The method according to claim 8, wherein the fiber has a percentage of nonbridging oxygens, calculated based upon the above-named components, of less than 64.1%.--

--10. The method according to claim 8, wherein the fiber compositions contain concentrations of SiO₂, CaO, and optionally MgO, P₂O₅, and B₂O₃ falling within the ranges:

{SiO ₂ }	44 wt% or more;
{CaO}	20 - 40 wt%;
{MgO}	0 - 18 wt%;
{P ₂ O ₅ }	0 - 12.5 wt%; and
{B ₂ O ₃ }	0 - 4 wt%

wherein {CaO} is the concentration of CaO in the fiber in wt%.--

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--11. The method according to claim 10, wherein the fiber compositions contain concentrations of SiO₂, CaO, P₂O₅, and optionally MgO and B₂O₃ falling within the ranges:

{SiO ₂ }	52 wt% to 58 wt%, when {MgO} ≤ 10 wt%, and 52 wt% to (58 + 0.5({MgO} - 10)) wt%, when {MgO} > 10 wt%;
{CaO}	22 wt% to 40 wt%;
{MgO}	0 wt% to 17.5 wt%;
({MgO} + {CaO})	< 42 wt%;
{P ₂ O ₅ }	0.5 wt% to 10 wt%;
{B ₂ O ₃ }	0 wt% to 2 wt%.--

--12. The method according to claim 10, wherein the fiber compositions contain concentrations of SiO₂, CaO, MgO, and optionally P₂O₅ and B₂O₃ falling within the ranges:

{SiO ₂ }	44.34 wt% to 62.48 wt%;
{CaO}	20.36 wt% to 39.4 wt%;
{MgO}	0.62 wt% to 21.16 wt%;
{P ₂ O ₅ }	0 wt% to 12.01 wt%;
{B ₂ O ₃ }	0 wt% to 3.54 wt%.--

--13. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO₂, CaO, P₂O₅, and optionally MgO and B₂O₃ in concentrations falling within the ranges:

{SiO ₂ }	52 wt% to 58 wt%, when {MgO} ≤ 10 wt%, and 52 wt% to (58 + 0.5({MgO} - 10)) wt%, when {MgO} > 10 wt%;
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{CaO} 22 wt% to 40 wt%;
{MgO} 0 wt% to 17.5 wt%;
({MgO} + {CaO}) < 42 wt%;
{P₂O₅} 0.5 wt% to 10 wt%; and
{B₂O₃} 0 wt% to 2 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, and {B₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, and B₂O₃, respectively, in the fiber in wt%, and wherein

(a) {SiO₂} + ({P₂O₅} - (58 + 0.5({MgO} - 10))) > -2.4 wt% if {MgO} > 10 wt%;

and

(b) {SiO₂} + ({P₂O₅} - 58) > -2.4 wt% if {MgO} ≤ 10; and

wherein the percentage of nonbridging oxygens calculated based upon the above-named components is less than 61.4%.--

--14. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO₂, CaO, MgO, and optionally P₂O₅ and B₂O₃ in concentrations falling within the ranges:

{SiO₂} 44.34 wt% to 62.48 wt%;
{CaO} 20.36 wt% to 39.4 wt%;
{MgO} 0.62 wt% to 21.16 wt%;
{P₂O₅} 0 wt% to 12.01 wt%;
{B₂O₃} 0 wt% to 3.54 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, and {B₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, and B₂O₃, respectively, in the fiber, and wherein

(a) {SiO₂} + ({P₂O₅} - (58 + 0.5({MgO} - 10))) > -2.4 wt% if {MgO} > 10 wt%;

and

(b) {SiO₂} + ({P₂O₅} - 58) > -2.4 wt% if {MgO} ≤ 10.--

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--15. A saline soluble inorganic fiber having a shrinkage of less than 3.5% when exposed to a temperature of 1000 °C for 24 hours and having a shrinkage of less than 3.5% when exposed to a temperature of 800 °C for 24 hours, comprising SiO₂, CaO, MgO, P₂O₅, and optionally B₂O₃, and Al₂O₃ in concentrations falling within the ranges:

{SiO ₂ }	52.4 wt% to 57.85 wt%;
{CaO}	22.2 wt% to 39.4 wt%;
{MgO}	1.96 wt% to 17.4 wt%;
{P ₂ O ₅ }	0.82 wt% to 7.8 wt%;
{B ₂ O ₃ }	0 wt% to 1.95 wt%; and
{Al ₂ O ₃ }	< 1 wt%;

wherein {SiO₂}, {CaO}, {MgO}, {P₂O₅}, {B₂O₃}, and {Al₂O₃} are the concentrations of SiO₂, CaO, MgO, P₂O₅, B₂O₃, and Al₂O₃, respectively, in the fiber in wt%,

- (a) {SiO₂} + ({P₂O₅} - (58 + 0.5({MgO} - 10))) > -2.4 wt% if {MgO} > 10 wt%;
and
(b) {SiO₂} + ({P₂O₅} - 58) > -2.4 wt% if {MgO} ≤ 10

REMARKS

Applicants have replaced existing claims 1-7 with new claims 8-15 in order to more closely comply with U.S. claim format. These new claims are fully supported by the original claims, and thus no new matter has been added. Further, no restriction of the scope of the original claims was intended by this amendment.

An early and favorable action on the merits is earnestly solicited.